AN ANNOTATED LIST OF THE FISHES OF HOMOSASSA SPRINGS, FLORIDA

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Homosassa Springs has long been known as an ichthyological paradise, for in the famous Fish Bowl of these springs are to be found both fresh water and salt water species of fishes living together in apparent harmony. The fishes vary in abundance from season to season and from year to year. Some species are found in vast numbers at all times, for example the northern sea catfish, whereas others, as the redfish or channel bass, are more common during the colder months of the year.

Homosassa is one of four large artesian springs along the west-central Florida coast. Each of these four springs has its origin within a few miles of the coast, and each flows as a large river westwardly to the Gulf. They are, in order from north to south, Crystal River, Homosassa, Chassahowitska, and Weekiwachee.

These four springs present an interesting study because of the differential upstream migration of certain marine fishes. Some species, for example the striped mullet, are present in the headwaters of all the springs, whereas others, as the Sheephead, are common only at Homosassa Springs and are absent in the headwaters of Weekiwachee and Chassahowitska.

Homosassa Springs is located one mile west of U. S. Highway 19 in Citrus County, Florida, roughly 55 air miles north of Tampa, or 75 miles by highway. The springs, of which there are more than 12, are the source of the Homosassa River which flows west for approximately 9 miles and empties into the Gulf. The springs are owned by the Homosassa River Corporation which is developing the area as a leading tourist attraction. Previous to the purchase of the property by this group in 1945, the springs were owned by the Homosassa Springs Corporation who held them for a period of 5 years.

The largest of the 12 springs mentioned above is called the Fish Bowl. Since a detailed report on the physical and chemical features of the springs has previously been published (Ferguson *et al.*, 1947, 57-59) we shall only summarize some of their findings as follows:

Maximum depth (Fish Bowl)	43.8 ft.
Temperature one foot below surface (Apr. 3, 1946)	75° F
Mean flow (cubic feet per second)	185
pH	7.4
Chloride (parts per million)	570
Total hardness as $CaCO_3$	310

For all practical purposes this water may be considered fresh. Sea water has approximately 39,000 parts chloride per million. (However, the above 570 parts is not sufficiently low so that the water may be used in U. S. Navy boilers where the maximum chloride allowed is 500 ppm.)

The ichthyology of the springs is very interesting, especially in that certain fresh water and marine species seem to live in association, and each to have adapted itself to the waters of the springs. A species present in one spring may be conspicuously absent in another spring only a few hundred yards distant. Although a number of ichthyologists have visited the springs, the only published records specifically concerning them are to be found in a paper by Dr. Gordon Gunter (1942). In this paper he records Dr. A. F. Carr's observations at the springs.

In previous years the great numbers of fishes which live in the Fish Bowl have been the cause of commercial fishing efforts. On one occasion dynamite was used quite effectively; however other methods were not so productive. Gill nets were found to be of little use, and even such drastic procedures as pouring burning oil on the surface of the water yielded few fishes.

The following provisional list of the 34 fishes representing 21 families to be found in the springs area is the result of a series of visits to that locality by the writers. The principal collecting trips were made on 17 February, 30 March and 4 May, 1946. All specimens collected are deposited in the Division of Fishes of the U. S. National Museum under catalogue numbers 133313 through 133341.

Grateful acknowledgment is made of the active cooperation of the personnel of the Homosassa River Corporation. Without the aid of Mr. David Newell, Mr. Jack Dunham and Mr. Elmo Reed, the data recorded in this paper could not have been collected.

SELACHII GEN. ET. SP. INCOGNITA

Shark

An unidentified shark was observed in the Fish Bowl by Mr. David Newell.

(?) DASYATIS SABINUS (LE SUEUR)

Sting Ray

A ray, probably this species, has been observed in the Fish Bowl by Mr. David Newell. Dr. Bigelow writes that the possibilities are good that it was *D. sabinus,* which in the Mississippi drainage is known to occur 200 miles upstream from the sea and in Florida is well distributed throughout the St. Johns River system.

ACIPENSER BREVIROSTRUM LE SUEUR

Short-nosed Sturgeon

One large specimen several feet in length is mounted on the wall of the Old Mill tavern at Old Homosassa Springs. It was said to have been taken in the river about 10 years ago. If valid, this record is probably the southernmost for the species along the west coast of Florida. Fowler (1945) has recorded the species from the Suwannee River.

LEPISOSTEUS OSSEUS (LINNAEUS)

Long-nosed Gar

This species is quite common down the river, and there are usually several individuals present at various times of the day in the Fish Bowl. The long-nosed gar is reported to be in spawning condition in the springs only during the spring months of February, March, and April; during these months the sheepshead have been observed to bite at the gravid female gars thus causing them to extrude their ova which are readily snapped up by the sheepshead (verbal communication from Mr. Elmo Reed). Gars have been observed only in the Fish Bowl, and in none of the other springs. The short-nosed or spotted gar (*Lepisosteus platyrhynchus*) has not been observed in any of the springs, although it should be in the river.

TARPON ATLANTICUS (CUVIER AND VALENCIENNES)

Tarpon

An individual of this species was observed near the boat dock by Mr. David Newell. Apparently this tarpon is attracted to spring

waters, for during May 1946 the senior author observed a small school of some 15 individuals (about 18″ long) in Sulphur Springs near Tampa, Florida. These tarpon were in the lower swimming pool of the springs and were not readily observed as they constantly swam into the boil of water caused by the overflow of the main spring which is also used as a swimming pool.

Erimyzon sucetta sucetta (Lacepede)
Eastern Lake Chub-sucker

Although this species has not been observed in the Fish Bowl by either of the writers, we are assured that it is present throughout most of the year. *Erimyzon* does not appear to be uncommon in the North Spring adjacent to the Fish Bowl and in the springs on the south arm of the river. The spotted sucker, *Minytrema melanops* (Rafinesque), was not observed, and although this latter species is common in the Suwannee drainage, it apparently does not occur this far south.

Erimystax harperi (Fowler)
Harper's Minnow

This attractive minnow, which is separated from all other Florida minnows by the small barbel at the juncture of the upper and lower jaw, is very common around the edge of the Fish Bowl where it lives in the weedy areas in association with *Chriopeops goodei* and *Lucania parva*. *E. harperi* was originally described from Manatee Springs which empties into the Suwannee River. Because of a discrepancy in the original description of *E. harperi*, topotypes of the species from Manatee Springs were collected and these compared with Homosassa material, which was found to be the same. On the 30th of March trip, gravid females were found. Counts of the numbers of eggs were made of 12 selected individuals and are recorded as follows:

Standard Length in mm	No. of Eggs Contained in Ovaries
30.6	126
30.0	99
28.7	110
28.7	118
28.1	91

27.7	104
27.3	98
27.1	65
26.6	84
26.6	107
26.4	74
25.2	77

NOTEMIGONUS CRYSOLEUCAS BOSCII (VALENCIENNES)
Florida Golden Shiner

This species has not been observed or collected in the Fish Bowl, although it has been observed in the North Spring, and in the Main Spring of the south arm of the river.

BAGRE MARINUS (MITCHELL)
Northern Sea Catfish

This is the only species collected in the spring by the writers; however, it should be pointed out that an adequate sample was not obtained, and whether the tremendous school of catfishes in the Fish Bowl is composed entirely of this species or partly of the next species listed remains to be determined.

GALEICHTHYS FELIS (LINNAEUS)
Gaff-topsail Catfish

No specimens of this species were collected by the writers, nor were any observed with facemask which could definitely be attributed to this species. This record is based upon Dr. A. F. Carr's notes recorded by Gunter (1942: 314).

AMEIURUS NATALIS EREBENNUS (JORDAN)
Yellow-bellied Catfish

Just behind the coffee shop at the Springs is a small rock-walled spring (6 feet in diameter) with no outlet. This small spring contains a number of 6 to 9 inch individuals of the yellow-bellied catfish, but the species is not found in any of the adjacent spring waters. No one has been able to state definitely that these fish were not planted in this small spring, and the fact that they have not been found in the surrounding waters rather strongly suggests that they may have been introduced.

Strongylura marina (Walbaum)

Northern Needlefish

This species was observed in the Fish Bowl on March 30, 1946, and is usually present in the vicinity of the boat dock. It is not so common in the Bowl as in adjacent river areas, and it has not been observed in any of the other springs.

Lucania parva (Baird and Girard)

Rainwater Killifish

This species lives in association with *Erimystax harperi* and *Chriopeops goodei* in the weed masses on the sides of the Fish Bowl. *Lucania* is about as common as *Erimystax,* whereas *Chriopeops* is the least common of the three. The broad indistinct dark bands present on some *Lucania* from other Florida springs (Rock Springs and Weekiva Springs, especially the latter) do not seem to be so apparent on these specimens. They were not taken in springs other than the Fish Bowl.

Chriopeops goodei (Jordan)

Red-finned Killifish

This form was common in weeds together with *Lucania* and *Erimystax.* It was taken only in the Fish Bowl.

Cyprinodon variegatus variegatus (Lacepede)

Southern Sheepshead Killifish

One specimen of this species was observed at the Pump Spring at the edge of the cement ledge on 3 May 1946. Unfortunately it could not be caught. It was not observed in any of the other springs.

Heterandria formosa (Agassiz)

Least Killifish

This very small species has been taken at the Fish Bowl where, because of its small size and ability to slip through the normal ¼ inch mesh seine, it is probably much more common than suspected. It has also been collected at the Pump Spring and at the North Spring next to the Fish Bowl. At times it is found in association with *Erimystax, Lucania* and *Chriopeops* in the weedy areas.

Mollienisia latipinna Le Sueur

Sailfin

Although this species has been collected in the North Spring and in the Pump Spring, it has not been found in the Fish Bowl, and such is also true of the next species, *Gambusia affinis holbrookii.* The absence of these two species from the Bowl is one of the unexplained mysteries of the ichthyology of the Springs. One specimen of *Mollienisia,* a melanistic individual, was collected in a small pond immediately behind the Springs Headquarters.

Gambusia affinis holbrookii (Girard)

Eastern Mosquito-fish

This species has been collected in the North Spring and in the Pump Spring, but has not been taken in the Fish Bowl, although it does occur just outside of the Bowl along the north side of Fish Bowl Run. *Gambusia* does not appear to be as common in the Springs as at other localities in Florida.

Centropomus undecimalis (Bloch)

Northern Robalo or Snook

Large specimens of this species, up to several feet in length, are quite common in the Fish Bowl, and on March 30, 1946, a single individual was observed in the bottom of the North Spring adjacent to the Fish Bowl. The snook presents a curious problem, for although one is quickly impressed with the numbers of snook present in the Fish Bowl, nevertheless, the species is not taken in the river nor at the river mouth. Neither is it observed enroute up or down the river although other marine species appearing in the Fish Bowl are observed or caught in the river.

Lutianus griseus (Linnaeus)

Mangrove or Gray Snapper

The gray snapper is fairly common in the area of the springs, and although it is very abundant in the spring run below the Bowl, it nevertheless does not come into the Bowl in any great numbers. This is especially true in summer, but the numbers are said to be greater in the colder months. Exactly the reverse is true of *Lagodon rhomboides.* The mangrove snapper has also been observed in some of the springs on the south arm of the river.

Lutianus apodus (Walbaum)
Schoolmaster

Although all specimens collected in the springs area were of the former species, *L. apodus* is recorded from the springs in Carr's notes (Gunter, 1942: 314). A few snappers which had a line beneath the eye were observed in the run below the Bowl and it is possible that they might have been this species. Mr. Jack Dunham states that he has not observed any fish which he believes could be definitely assigned to this species.

Lagodon rhomboides (Linnaeus)
Pinfish

It is possible that another species may be confused with this one. Only one specimen was collected, and its characters were somewhat at variance with those given for *L. rhomboides.* It was observed and collected only in the Fish Bowl. It is also recorded by Carr in Gunter (1942: 315).

Archosargus probatocephalus (Walbaum)
Sheepshead

This species is very common in the Fish Bowl, but has not been observed in other of the springs nor in the run from the Bowl. The snapping by *Archosargus* at gravid females of *Lepisosteus* has been described under that form. It is also recorded by Carr (Gunter, 1942: 315).

Eucinostomous argenteus Baird and Girard
Spotfin Mojarra

This striking silver-colored fish is found only on the sandy bottom areas of the south arm of the springs. As one poles a boat upstream from the bridge, many individuals may be seen darting ahead of the boat. With face mask, they may be observed feeding on the mushy rubble surrounding a small spring just above the bridge. This mojarra was found to be very hard to net, but finally a single specimen was speared. This, together with another specimen from Crystal River Spring (USNM 133340 and 133341), was examined by Dr. Leonard P. Schultz of the United States National Museum, and upon dissection both were found to be of this species. This is a new addition to the known fauna of the Florida fresh waters.

Sciaenops ocellatus (Linnaeus)

Channel Bass

One or two individuals of this species were in the Fish Bowl each time that face mask observations were made. Often they would not be visible from the surface as they seemed to habituate the rocky crevice area on the far side of the Bowl, and often, in the same manner as the Sea Trout, they would sound as the investigator came into the water. Usually during the colder months they are reportedly more abundant in the Bowl than at other times. They have not been observed in the other springs.

Cynoscion nebulosus (Cuvier and Valenciennes)

Sea Trout

Several individuals of the sea trout were usually in the Bowl each time that observations were made. As previously stated, they sound as soon as the biologist enters the water. This species is also said to be more common during the winter months.

Chaenobryttus coronarius (Bartram)

Warmouth Bass

Although said to be not uncommon in the river in the vicinity of the Springs, only one specimen was taken in any of the springs, and that one was collected from the Pump Spring on May 3, 1943. None was observed by use of face masks.

Lepomis macrochirus purpurescens Cope

Eastern Bluegill

This species is very common in the springs area, and has been observed in all of the springs. Characteristically, individuals in this area show the typical artesian spring coloration, *i.e.*, heavy vertical banding with light ground color. It should be noted that none of the bluegills in the Springs have the dark overall coloration which often appears in large individuals living in lakes.

Lepomis punctatus punctatus (Cuvier and Valenciennes)

Stumpknocker

In the central Florida springs this is one of the commonest of sunfishes. It is fairly abundant at Homosassa Springs where it has been collected in the Fish Bowl and observed in the other springs.

Lepomis microlophis microlophis (Günther)

Eastern Shellcracker

This well-marked species, distinguished by its orange ear spot, is present in limited numbers in the Fish Bowl and the North Spring. It has not been observed nor collected in the springs on the south arm of the river.

Micropterus salmoides floridanus (Le Seuer)

Largemouth Bass

Although the largemouth seems to be of normal abundance in the Homosassa Springs other than the Fish Bowl, a satisfactory reason yet remains to be advanced as to why it is so uncommon in the Fish Bowl. With the face mask it was often possible to distinguish one or more specimens in the Bowl, but the maximum observed at one period of observation was five, and the number was usually one or two or none. It has been suggested that physico-chemical factors may be involved in this matter, but such yet remains to be determined. The largemouth has been observed in all of the springs.

Mugil cephalus Linnaeus

Striped Mullet

The striped mullet is one of the commoner and more obvious fishes in the Fish Bowl where several individuals will usually be found feeding at any time of the day. The striped mullet is said to be most common in the Bowl during the months of October, November, and December, during which period the females are said to be gravid. Often this species tends to school in the Fish Bowl, and especially is this true late in the evening. It seems to be fairly well distributed in the area, and has been observed in the North Spring and in the Main Spring of the south arm of the river.

Mugil curema Cuvier and Valenciennes

White or Silver Mullet

This species is not so common as the previous form, and although one or more individuals are often observed in the Bowl it has not been recorded in the other springs in the area.

Caranx hippos (Linnaeus)

Common Jack or Crevally

One or more individuals of this species were observed on various occasions swimming slowly about the Fish Bowl; the species has not been observed in the other springs.

Echeneis naucrates Linnaeus

Shark Remora

This species is recorded by Gunter (1942: 315) from the notes of A. F. Carr, Jr. It is not known by other than this record, exact details of which are not available. Mr. Jack Dunham informs us that he observed three or four specimens during 1946 which were possibly of this species. They were attached to mullet, snook, and jack crevally.

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